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USDA ■ Forest Service

forest insect & disease management methods application group

2810 Chiles Rd. ■ Davis, Ca. 95616

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NEWSLETTER

NEW MAG PHONE NUMBER

New and hopefully better quality FTS Lines have been installed at MAG. Effective October 6, 1976, our new FTS number is 448-3445. Our local Davis commercial number remains unchanged, (916) 758-7850. Our commercial FTS prefix is 440.

MAG COMPUTER ACCESS

A Singer 1500 terminal has been installed at MAG and is now fully operational. This system provides the following:

1. Batch Mode (2,000 baud) to the Ft. Collins Computer Center (FCCC).
2. Demand Mode (300 baud) to FCCC.
3. Off-line data preparation and editing.
4. Demand Mode (300 baud) to the University of California, Davis Computer Center.

The hardware consists of a 300 lines-a-minute (132 character) printer, a card reader, a CRT terminal, and the necessary communication adapters. The terminal is an intelligent 8k unit which, through the use of cassette "mini" program tapes, can make the system compatible with many computers. The main uses have been batch mode through FCCC and demand mode with U.C. Davis.

The in-house system provides quick access to the data files through FCCC from other FI&DM field units when asked to assist with their data analysis and special data handling problems. We hope to make this system available as a training tool in data processing and as a service to analysis of problems of unusual complexity at the field level.

Another unit available is a portable demand terminal (Teleterm 1030). This system is used in demand mode with U.C. Davis and FCCC.

MAINE SPRUCE BUDWORM PROJECT

A team from MAG consisting of Jack Barry, Ray Luebbe, and Bill Ciesla assisted the Northeastern Area, State and Private Forestry (NA) and the Maine Forest Service during May and June in pilot and operational projects directed at the spruce budworm outbreak in northern Maine. This project, probably the largest of its kind ever undertaken in the U.S., involved extensive use of large, four-engine aircraft (C-54's and Constellations) equipped with the Litton inertial guidance systems, along with helicopters, TBM's, and PV2's.



*Bob Young demonstrating terminal to
Bob Ford of the NA's Portsmouth, NH
field office.*

DUGWAY DEPOSIT ASSESSMENT PROGRAM

A computer program for assessing spray deposits, originally developed by the U.S. Army Dugway Proving Grounds, Utah, has been placed at the computer center of the University of California, Davis, by MAG. Inputs to this program are number of spray drops and specified size classes, the density of spray material, and the drop-to-stain relationships. Outputs are mass median diameter, average drop diameter, number and mass in each size category, and total mass per square meter or ounces per acre. These are the basic statistics required to establish deposit/mortality relationships and assess overall quality of the application.

This program has been used successfully on a number of forest aerial spray projects in recent years and is now available from Ray Luebke, MAG Mathematical Statistician. We hope to have system documentation available in the near future and ultimately put the system up at the Ft. Collins Computer Center for field use.



Pair of C-54's applying Sevin 4-oil to budworm infested forests in northern Maine.

A total of 3.5 million acres were included in the operational program. Pilot control projects conducted by the Portsmouth, New Hampshire, field office of the NA were designed to evaluate reduced dosages of Orthene, Dylox, and Sevin. In addition, a special evaluation designed to compare efficacy of 3/4 vs. 1 pound Sevin per acre using four-engine aircraft was conducted by Maine Forest Service.

The MAG team provided training to the NA and State of Maine personnel in calibration of spray aircraft and assisted in statistical design of the pilot projects and spray deposit assessment.

FIELD CHARACTERIZATION OF SPRAY AIRCRAFT

Spray droplet size and density have long been known as critical factors in determining the success or failure of aerial spray projects. Data on droplet size and deposition have been routinely measured as a part of the evaluation of field experiments and pilot or operational projects. Procedures to measure these variables are time consuming, however, and normally data has not been available until 6 to 9 months after the project has been completed. Consequently, major use of deposit data has been to explain project failure due to faulty application technique.

In order to build better controls into project administration and consequently insure success of aerial spray projects, project directors must know droplet spectra and deposition patterns that contract spray aircraft are capable of producing before spraying begins. To do this, MAG initiated a project designed to evaluate alternative rapid field characterization procedures for spray aircraft. Principle investigators in this effort were the Missoula Equipment Development Center (MEDC) and the H.E. Cramer Corporation, a private meteorological consultant firm in Salt Lake City, Utah.

Nineteen trials were conducted near Townsend, Montana, during June 1976, with a Bell 205 helicopter. These trials were conducted in conjunction with pilot control projects of Orthene and Dylox against western spruce budworm in Montana. Data on spray characteristics of the contract aircraft were made available to the project director within five hours after field trials were completed. This gave the project director the opportunity to alter swath width, air speed, spray nozzles, etc., to bring spray craft within the desired contract specifications regarding droplet size and deposition, thus further insuring the success of this project. Data from these trials are currently being analyzed by the investigators with the target of having operational procedures for rapid field characterization of spray aircraft ready for implementation in 1977.

STATEWIDE LOSS SURVEYS

One of MAG's principle charters is to design and initiate methods for inventorying tree damage and losses by forest insects and diseases as a basis for providing meaningful impact information. In recent weeks, MAG has been consulting with field units, research, and other interested parties in investigating the feasibility of providing loss statistics on a State-wide basis to satisfy national data requirements. As a starter, efforts are being directed toward measuring losses caused by mountain pine beetle and dwarf mistletoe.



Bell 205 helicopter undergoing characterization near Townsend, MT.

Plans are to design and initiate surveys on relatively small areas (i.e., forest or reporting units) in 1977, expand the system to a much larger area in 1978, and be fully operational on a statewide level by 1980. MAG will be involved in planning, designing, training and coordination, while the collection of field data will be the primary responsibility of the Areas/Regions.

For mountain pine beetle, basic approach will be a multi-stage system which combines various levels of stratification and measurement. These stages will include aerial sketch mapping, large scale photography, and ground sampling. Among the parameters measured will be annual and cumulative tree mortality, residual green stand, and volume.

Dwarf mistletoes are being considered as the first disease for which MAG will coordinate compilation of Statewide loss data. Initial discussions with Forest Insect and Disease Management and research personnel have provided guidelines with which to approach data collection. Emphasis will be on use of existing inventory systems and stand projection models such as LPMIST, SWLYD and SWLYD 2.

SPRUCE BUDWORM PILOT PROJECT DATA MANAGEMENT SYSTEM

Entomologists in Region 1, Missoula, Montana, recognizing the need for rapid processing of data from pilot projects in order to make timely presentations of results for pesticide registration or planning of operational projects, have designed and implemented a streamlined data processing system. This system includes initial summarization of field and

laboratory data with a hand programmable calculator and final processing with an interactive computer. A sampling procedure designed for spruce budworm pilot projects in 1975, was used as the basis for this system. It provided final results of mortality rates and residual population densities, allowing publication of a progress report within two weeks after collection of the final post-spray samples.

Bob Young, MAG Biometrician, working with Wayne Bousfield, R1 Entomologist, put the interactive portions of this data management system up at Ft. Collins Computer Center, and added some standard statistical analysis routines, i.e., analysis of variance, to the system.

This system was subsequently used to analyze data from pilot and operational spruce budworm projects in northern Maine and operational projects in central Washington. In addition, data from field experiments of Orthene and Lannate against western spruce budworm in Idaho conducted by the Field Evaluation of Chemical Insecticides Project of the Pacific Southwest Forest and Range Experiment Station were analyzed with this data management system.

Ability to analyze spruce budworm pilot project data sets from various parts of the nation with a single data management system was a payoff of the November 5, 1975, coordination meeting in Salt Lake City, where participants attempted to build comparability into spruce budworm pilot project sampling methods.

Immediate payoffs of this effort are time saved by field entomologists in redesigning sampling systems for spruce budworm projects, rapid turnaround time in data analysis and reporting, and comparability of results from area to area encompassing many diverse forest types and conditions.

WESTERN SPRUCE BUDWORM EGG MASS SURVEYS

A special working group to improve egg mass sampling procedures for the western spruce budworm was established in response to requests from several Regions. Objectives for this group are:

1. To standardize sampling methods and reporting format facilitating comparison of data between Regions.
2. To evaluate reliability of egg mass sampling westwide as a means of predicting defoliation.
3. To have reliable and defensible defoliation prediction models for western spruce budworm by the 1978 field season.



Western spruce budworm - Improved egg mass surveys are the target of a special multi-regional working group.

Participants include: R-1, Wayne Bousfield; R-2, Charles Minnemeyer and Don Cahill; R-3, Robert Acciavatti and Doug Parker; R-4, Larry Stipe; R-6, Bob Dolph; Intermountain Station, Dave Fellin; and Dave Grimble, Bill Ciesla and Bob Young from MAG. Dave Grimble is functioning as chairman of this group.

The group held its first meeting in Davis on July 22-23, 1976, to discuss problems and direction for the 1976 field season. Approach to be followed in each of the 5 western Regions is:

1. Primary sample unit will be a plot cluster consisting of three trees. Two 70 cm branches will be removed from midcrown of each tree. Number of plots in each geographical area may vary depending on survey objectives.
2. Sample trees will be open grown Douglas-fir, 30 to 60 feet tall which show some defoliation but not complete defoliation or dead tops.
3. Egg mass density will be expressed as number of new egg masses per square meter of foliage.
4. Defoliation on sample trees in 1977 will be expressed as a percentage based upon a sample of 25 buds from each of four midcrown terminal branches per sample tree.

Common field data forms were designed for both egg mass and defoliation estimates for use by all survey entomologists conducting western spruce budworm surveys.

PAPERS, PUBLICATIONS AND
PRESENTATIONS

Bill Klein presented a paper entitled "Measuring the impact of the mountain pine beetle in lodgepole pine" to the International Congress of Entomology, Washington, D.C. on August 22, 1976.

Recent publications by MAG staff:
Ciesla, W.M., S. Kohler, J.E. Dewey
and M.D. McGregor, 1976. Field efficacy
of aerial applications of carbaryl
against Douglas-fir tussock moth,
J. Econ. Entomol., 69 (2):219-224.

Ciesla, W.M., 1976. Observations of
the life history and habits of the
pine sawfly, *Neodiprion nanulus contortae*,
(Hymenoptera:Diprionidae). Annals
Entomol. Soc. America, 69 (3):391-394.



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